1891MNRAS..51..306D

differences of both thermometers are proportional to the excess of temperature of the strata which cause the refraction in the observing-room.

Comparison of the Star-places of the Greenwich Ten-year Catalogue with those of the Second Melbourne General Catalogue, and with those of the Cape Catalogue for 1880. By A. M. W. Downing, M.A.

The epoch of the Greenwich Ten-year Catalogue and that of the Second Melbourne General Catalogue being the same (1880), the comparison between the places of the stars common to both—472 in number—is a very easy matter. The effect of a difference in the values of the assumed proper motions in any particular cases has been neglected in making the comparison, it being assumed that, in the mean, the effect of such differences would be inappreciable.

The following *errata* have been detected during the progress of the work:—

Greenwich, No. 1,627, *Lalande* 19,433,
for R.A. $9^{h}\ 49^{m}\ 11^{s}{\cdot}586$ *read* $9^{h}\ 49^{m}\ 12^{s}{\cdot}586$.
Melbourne, No. 735, γ *Hydræ*,
for R.A. $13^{h}\ 12^{m}\ 25^{s}.02$ *read* $13^{h}\ 12^{m}\ 24^{s}{\cdot}02$.

Table I., given below, exhibits the differences Greenwich-Melbourne when the stars are arranged in order of N.P.D., and grouped as shown. Table II. gives the same differences when the stars are arranged in order of R.A., taken in groups of 1^{h} each.

TABLE I.

Extent of Group.	$\Delta\alpha$	$\Delta\delta$	No. of Stars in Group.
° °	s	″	
40–50	−·009	−0·56	22
50–60	−·009	−0·52	13
60–65	+·005	+0·31	24
65–70	+·003	+0·75	23
70–75	+·014	+0·96	14
75–80	+·001	+0·87	21
80–85	−·019	+0·68	27
85–90	−·017	+0·48	30
90–95	−·012	+0·62	42
95–100	−·003	+1·05	47
100–105	+·016	+1·30	67
105–110	+·042	+1·13	63
110–115	+·055	+1·34	42
115–120	+·071	+1·48	14
120–125	+·087	+2·05	23
40–125	+·015	+0·90	472

1891MNRAS..51..306D

Table II.

Extent of Group.	$\Delta\alpha$	$\Delta\delta$	No. of Stars in Group.
h h	s	″	
0–1	+·021	+0·54	15
1–2	+·028	+1·29	17
2–3	+·053	+1·10	18
3–4	+·039	+0·68	22
4–5	−·001	+1·19	19
5–6	−·023	+0·61	26
6–7	−·003	+0·79	20
7–8	+·011	+0·98	21
8–9	+·008	+0·53	16
9–10	+·006	+1·09	18
10–11	+·025	+0·94	16
11–12	+·007	+0·72	16
12–13	+·015	+0·79	18
13–14	+·013	+0·90	16
14–15	+·004	+0·71	20
15–16	−·013	+0·34	15
16–17	+·022	+0·91	18
17–18	+·006	+0·73	17
18–19	−·001	+0·69	18
19–20	+·041	+0·72	21
20–21	+·013	+1·03	30
21–22	+·037	+1·05	19
22–23	+·028	+1·31	21
23–24	+·028	+1·44	35
0–24	+·015	+0·90	472

The following table gives the probable errors of a difference between the Catalogue places of a star, in R.A. and N.P.D. respectively, at different N.P.D.'s:—

1891MNRAS..51..306D

TABLE III.

N.P.D.	ϵ_α	ϵ_α sin N.P.D.	ϵ_δ	No. of Stars in Group.
° °	s	s	″	
40–50	·036	·025	1·24	22
50–60	·044	·036	0·41	13
60–65	·024	·021	0·43	24
65–70	·024	·022	0·41	23
70–75	·030	·029	0·33	14
75–80	·016	·016	0·28	21
80–85	·028	·028	0·41	27
85–90	·025	·025	0·30	30
90–95	·033	·033	0·49	42
95–100	·037	·037	0·46	47
100–105	·043	·042	0·54	67
105–110	·041	·039	0·47	63
110–115	·040	·036	0·56	42
115–120	·042	·037	0·43	14
120–125	·055	·046	1·08	23

The mean value of ϵ_α sin N.P.D. is $^{\mathrm{s}}\cdot031$, and that of ϵ_δ is 0″·52. Assuming that the places of stars in the two catalogues are equally affected by accidental errors, it follows that the mean probable errors of a R.A. and N.P.D. in either are $\pm\,^{\mathrm{s}}\cdot022$ cosec N.P.D. and ± 0″·37 respectively.

The differences exhibited in Tables I. and II. above, in R.A. and N.P.D. respectively, have been laid down as points on cross-ruled paper, and curves drawn through them, from which the differences corresponding to any R.A. or to any N.P.D. between the extreme limits can be read off. To each of the differences arranged in order of R.A. has been applied the mean difference ($+^{\mathrm{s}}\cdot015$ and +0″·90 in R.A. and N.P.D. respectively), with reversed sign, before entry in Table IV. below; so that the difference in either R.A. or N.P.D., corresponding to any position, is the sum of the quantities taken from Tables IV. and V. It is further to be remarked that the N.P.D.'s of the Second Melbourne General Catalogue, from N.P.D. 37° 50′ to 127° 50′, are corrected by the quantity $-0''{\cdot}149 + 0{\cdot}00914$ R, where R is the refraction of the *Tabulæ Regiomontanæ*. This was done "for the sake of uniformity," a similar correction having been applied to the N.P.D.'s of the First Melbourne General Catalogue, as the result of an examination of certain Melbourne observations. It appears, however, from a discussion published in *Monthly Notices*, vol. xli. pp. 346–357, that the conclusions previously arrived at on this point require considerable modification. Accordingly, in the comparison of the N.P.D.'s arranged

1891MNRAS..51..306D

in order of N.P.D. in Table V. given below, whilst Column I. gives the comparison of Catalogue places as published, Column II. gives the comparison with the Melbourne places reduced with the refractions of the *Tabulæ Regiomontanæ*, and the corresponding correction applied to the value of the adopted latitude.

Column II. is, of course, the one that ought to be used in any discussion concerning the accuracy of the refractions adopted at Greenwich.

The differences Greenwich-Cape given below are derived from the values of Greenwich-Melbourne here given, combined with the values Melbourne-Cape published in *Monthly Notices*, vol. l. pp. 485, 486.

The comparatively large differences in R.A., in Table V., from N.P.D. 110° to 120°, and which are of the *same sign* in the comparisons of Greenwich with both Melbourne and the Cape, will be noticed.

Table IV.

R.A.	Greenwich-Melbourne.		Greenwich-Cape.	
h	s	"	s	"
0·0	+·010	+0·12	−·011	−0·13
1·0	+·012	+0·10	−·005	−0·10
2·0	+·024	+0·18	+·013	+0·04
3·0	+·023	+0·09	+·020	+0·08
4·0	+·006	+0·02	+·019	−0·02
5·0	−·018	−0·02	−·002	−0·22
6·0	−·025	−0·10	−·011	−0·25
7·0	−·015	−0·08	+·001	−0·12
8·0	−·006	−0·10	+·004	−0·15
9·0	−·005	−0·06	−·012	−0·09
10·0	−·001	+0·02	−·025	+0·10
11·0	·000	−0·06	−·042	+0·12
12·0	−·001	−0·10	−·042	+0·18
13·0	−·002	−0·08	−·034	+0·28
14·0	−·007	−0·14	−·039	+0·28
15·0	−·014	−0·28	−·038	+0·15
16·0	−·011	−0·26	−·021	+0·11
17·0	−·005	−0·14	−·005	+0·21
18·0	−·004	−0·12	+·008	+0·20
19·0	+·003	−0·12	+·013	+0·15
20·0	+·011	−0·04	+·026	+0·21
21·0	+·012	+0·12	+·045	+0·33
22·0	+·015	+0·30	+·043	+0·33
23·0	+·015	+0·32	+·005	+0·09

1891MNRAS..51..306D

TABLE V.

N.P.D.	Greenwich-Melbourne.			Greenwich-Cape.	
		I.	II.		
°	s	″	″	s	″
50	− ·009	− 0·54	+ 1·71		
55	− ·005	− 0·50	+ 1·05	− ·008	+ 0·09
60	·000	0·00	+ 1·15	− ·004	+ 0·33
65	+ ·005	+ 0·53	+ 1·41	·000	+ 0·51
70	+ ·008	+ 0·88	+ 1·58	+ ·003	+ 0·53
75	+ ·004	+ 0·90	+ 1·45	+ ·002	+ 0·59
80	− ·009	+ 0·76	+ 1·20	− ·001	+ 0·59
85	− ·016	+ 0·58	+ 0·92	− ·005	+ 0·40
90	− ·014	+ 0·56	+ 0·82	− ·012	+ 0·17
95	− ·007	+ 0·82	+ 1·01	− ·011	+ 0·15
100	+ ·008	+ 1·20	+ 1·33	+ ·002	+ 0·35
105	+ ·027	+ 1·24	+ 1·32	+ ·014	+ 0·44
110	+ ·049	+ 1·24	+ 1·26	+ ·030	+ 0·54
115	+ ·065	+ 1·40	+ 1·37	+ ·054	+ 0·75
120	+ ·079	+ 1·77	+ 1·69	+ ·069	+ 1·14

Blackheath:
February 1891.

Note on the Parallax of β Aurigæ. By the Rev. Professor Pritchard, D.D., F.R.S.

Attention having been called to this star by the remarkable spectroscopic observations that have been made at Harvard and Potsdam, preparations were made for the early determination of the parallax. These observations necessarily come within the scheme for the determination of the relative parallax of the stars of the 2nd magnitude, in process of reduction at Oxford.

This star has been referred to two others, whose magnitudes are respectively 8 8 and 10·2 magnitude, and whose approximate co-ordinates are—

	Pos. Ang.	Distance.
	° ′	″
a	91 50	710·9
b	269 10	945·2

The resulting parallax from each of the stars is—

a	+ 0″·065 ± 0″·024
b	+ 0·059 ± 0·025

The identity of these relative parallaxes leads to the conclusion that the stars of comparison are either situated on a sphere